discrimination. Other things being equal, sulphate of ammonia is more suitable than nitrate of soda for use in the West of England, whereas the order is reversed in the drier climate of the Eastern districts. The behaviour of soluble plant-food under the influence of heavy rainfall should be considered by farmers in purchasing their supplies of spring manures. The excessive rainfall of the past winter—especially coming, as it did, after a long period of drought—must have very seriously depleted the soil of its natural nitrates, so that increased purchases of active nitrogenous manures for the crops of the current year are clearly indicated.

Let us hope that the reception given to the present volume will induce the author to proceed, without delay, to redeem his provisional promise of a work on the cognate subject of the chemistry of soil. W. S.

Electric Wiring, Fittings, Switches and Lamps. By W. Perren Maycock, M.I.E.E. Pp. xv + 446; with 360 illustrations. (London: Whittaker and Co., 1899.)

Electric Bells and Alarms. By F. E. Powell. Pp. 77; with 51 illustrations. (London: Dawbarn and Ward, Ltd.)

MR. PERREN MAYCOCK, who has already written a number of excellent text-books on electrotechnical subjects, has produced in the present case a book which, while offering no particular attractions to the non-technical reader, undoubtedly serves the purpose for which it is written; namely, to give a thorough idea of present practice in the electric lighting of buildings. The book is the more welcome since the widespread introduction of 200 and 220 volt lamps during the last three years has rendered all books dealing with electric-light fittings written previous to that time seriously out of date. It is not merely the perfecting of the 200 volt lamp which has rendered this change possible. The design of lamp-sockets, switches and fuses has been of late much improved. The fewness of parts, the simplicity of construction, and the ease and security of wiring of the modern lamp-socket are in striking contrast to the older fittings. These improvements, though apparently trivial, are none the less important.

Another change of the last few years has been the gradual displacement for all but street lighting of the open arc by the enclosed arc lamp, with its greatly lengthened arc and its increased electromotive force and reduced current. Mr. Maycock's passing description of the Nernst lamp reminds one that that most promising novelty has not yet made its *début* as a commercial article.

The illustrations to the text are numerous, and the sectional drawings on the whole very clear. The practice of taking illustrations largely from manufacturers' trade-lists, which is usually to be deplored, is in the present case justified. In no other way could the fittings at present available be properly described. We recommend Mr. Maycock's book as the best we have seen on the subject.

Mr. Powell's unpretentious little book or pamphlet on electric bells and alarms forms No. 3 of the "Model Engineer" series. It furnishes the reader with an attractive and satisfactory account of the various forms of a most useful, if humble, piece of electrical apparatus.

D. K. M.

Report of the Marine Biologist for the Year 1898. *Cape of Good Hope Department of Agriculture.* Pp. v + 362. (Cape Town: Richards, 1899.)

THE Cape Government is to be congratulated upon the success which has attended its efforts to investigate the sea-fisheries of the Colony. Dr. Gilchrist, the marine biologist who was appointed to inquire into the best means of developing the fisheries, was undoubtedly well advised in securing, at the very commencement of his undertaking, a properly equipped steam fishing vessel of sufficient size and power to safely keep the sea, and the results recorded in the present report justify, in a manner almost beyond what could have been anticipated, the expense which the purchase and up-keep of such a vessel has entailed. It has been clearly shown that the seas around the Cape of Good Hope contain a vast source of unexploited wealth, the development of which would provide a valuable and healthy addition to the food-supply of the people. So far as can be gathered from the report, the only difficulty to be contended with is that of getting the fish to the centres of population in a fresh condition. With a climate such as that of Cape Colony it would seem that the best means of overcoming this difficulty is by the use of refrigerating chambers both on the fishing-vessels themselves and on the trains used for transporting the fish by land.

The present report does not attempt to deal with the more scientific aspects of fishery investigation, although there is evidence that this side of the question is not being altogether neglected. It is of the greatest importance that the newly discovered fishing-grounds should be very thoroughly investigated at the present juncture, before much fishing has taken place upon them, and this investigation should deal, not only with the fish population, but quite as thoroughly with the lower forms of life, which are the food of the fishes. Such an investigation will be invaluable in after years, as it will make it possible to ascertain exactly what influence constant fishing has produced, and many evils which have arisen in the European fisheries may be avoided. It is greatly to be desired that the Government of the Cape of Good Hope will show themselves sufficiently enlightened to realise the immense value of accurate scientific investigations at the present time, and the unique opportunity which they now possess—an opportunitg which will probably never return—of developing their fisheries upon sound and scientific principles, based upon a trustworthy record of facts. E. J. ALLEN.

Science Course for Secondary Schools. By G. Robb and J. Mirguet. In Three Parts. I. "Practical Physics," pp. 167; II. "Notions of Physics," pp. 247; III. "Practical Chemistry," pp. 182. (Cairo: National Printing Office, 1898–99.)

THESE three small volumes have been specially compiled to meet the requirements of the Science Syllabus prescribed by the Ministry of Public Instruction to be used in the Secondary Schools under the management of the Egyptian Government.

Part i., "Practical Physics," consists of a series of experiments illustrative of the initial phenomena to be observed by the elementary pupil during his first year. The plan adopted is to first describe an experiment, and afterwards enunciate the law to be associated with it. The first five chapters deal with measurements of length, area, volume, force and weight, succeeding chapters being devoted to density, composition of forces, centre of gravity and equilibrium, properties of matter, elementary hydrostatics and theory of gases. The text is sufficiently ample for clearness without being so detailed as to take the place of a text-book.

Part ii., "Notions of Physics," is in effect a text-book for the assistance of second year pupils in following the series of demonstrations given by the teacher, which constitute the whole of the second year's course. If, as the author's statement appears to indicate, it is a fact that for a complete year the students simply attend a course of experimental lectures without doing *any* practical work themselves, this would hardly, according to modern views, be consistent with the pupils obtaining the maximum advantage from their instruction. The opening chapters deal with the phenomena connected

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with motion, gravitation, inertia and energy, all units measurements and numerical examples being expressed in the metric system. Following these are sections treating of the elementary phenomena of heat, light and electricity. Magnetism, however, strangely enough, appears to have been entirely neglected, but no statement is made in explanation of this somewhat unusual omission. The arrangement and style of both text and illustrations are very good, the only objectionable feature being the ambiguity of a few of the mathematical signs, this being probably explained by the statement of the author that French types were used in this book. Some 240 illustrations add considerably to the utility of the volume.

Part iii., "Practical Chemistry," presents, in the form of a number of described experiments, the mode of preparation and properties of the more common elements and simple compounds. In addition to the actual descriptions of these bodies, much correlative matter is also included as to their distribution and economic use. A noticeable omission, from the reader's point of view, is the fact that no equations representing the preparations and reactions of the various substances are given in the text. A collection of equations is, however, given in an appendix at the end of the volume, but it is specially mentioned that the matter contained in this appendix is beyond the scope of the examination. Seeing that this is the third year of the pupil's training, and considering the important manner in which chemical equations enable a student to more easily understand the nature of a reaction by showing at a glance how the several constituents of a mixture arrange themselves, it is difficult to agree with such an omission. The experiments themselves are well chosen, and are usefully illustrated by numerous cuts of the apparatus in position. Each substance is discussed under the headings:—(1) Preparation; (2) Physical properties; (3) Chemical properties; (4) Occurrence and Uses.

L'Échappement dans les Machines à vapeur. By G. Leloutre. Pp. 156. (Paris: Gauthier-Villars. Masson and Co., 1900)

Produits aromatiques; artificiels et naturels. By Dr. G. F. Jaubert. Pp. 169. (Same publishers.)

THESE two volumes are the latest additions to the comprehensive series published as the Encyclopédie scientifique des Aide-Mémoire. M. Leloutre has for many years carried on experimental and analytical researches upon steam engines, with particular reference to the condition of the steam in a cylinder during compression and exhaustion, and under different conditions. In the present volume he extends the results arrived at in his "Théorie générale de la machine à vapeur," and adds to his fundamental equations for the analysis of the trial of a steam engine a sixth term depending upon the condition of the steam in the cylinder at the end of the exhaust.

The natural and artificial aromatic substances at present known are tabulated by Dr. Jaubert. They are arranged in five classes, namely, aromatic alcohols; aromatic acids; terpenes; camphors; alcohols, aldehydes and terpene acids. A short description is given of the characteristics of each class, and following it are tables showing the commercial name, scientific name, empirical and constitutional formulæ, method of preparation, references to literature, properties and characteristic reactions. The study of these compounds is now the most important branch of organic chemistry, not only from the point of view of pure science, but also on account of their commercial value. The book should therefore be found of service to both chemists and pharmacists, as a convenient work of reference.

Grundzuge der geographisch-morphologischen Methode der Pflanzensystematik. By Dr. R. von Wettstein. Pp. 64. Mit 7 lith. Karten und 4 Abbildungen im text. (Jena: Gustav Fischer, 1898.)

THIS suggestive little work, coming as it does from the pen of Prof. von Wettstein, will be read with attention by all who are interested in the wider problems of systematic botany. The author contends that a separation of species or sub-species on morphological grounds alone is unsatisfactory, and he reminds his readers that the appreciation of differences by this method must be ultimately a purely subjective one, and that the conclusions arrived at are liable to be vitiated on several grounds. Von Wettstein pleads for a more general recognition of the geographical areas occupied by species, and considers that a careful study of these will eliminate errors due to modifications depending on climatical or other physical conditions; and it is well known how efficient these are in producing races which, though retaining a general resemblance to a common ancestor, may yet be greatly dissimilar amongst themselves.

He applies his methods to a study of the Endotricha-series of Gentians, and thus comes to reduce the twenty-two species to six ground-forms or genuine species.

He further discusses some of the Euphrasias, and arrives at a corresponding result. It may, however, be urged that this method also is open to objection, and that more is to be got out of the study of species by experimental cultivation—an arduous task, but one which will perhaps yield more fruitful results than even the application of the geographical-morphological method.

Dreams of a Spirit-Seer, illustrated by Dreams of Metaphysics. By Immanuel Kant. Translated by E. F. Goerwitz, and edited with an introduction and notes by Frank Sewall. Pp. xiv + 162. (London: Swan, Sonnenschein and Co., Ltd., 1900.)

THE chief object in publishing this translation of Kant's "Traüme," which first appeared in 1766, is to show the relation between the philosophy of Kant and the teachings of Swedenborg. Students of metaphysics and psychology will appreciate this aid to a study of Kant's philosophical development.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

On the Process of Dyeing with Woad Alone.

IN my paper in NATURE (February 1, 1900, p. 331) on the blue colour in woad, no account is given of the method by which prepared woad can be used for dyeing wool blue. Some of my friends have suggested that the above-named communication was, in consequence, like the play of *Hamlet* with the Prince of Denmark left out. The request for information then made as to the *modus operandi* of the mediæval dyers who used woad and woad alone for dyeing blue has up to the present yielded no response.

There exists a tendency to believe that by long-continued cultivation the woad now grown and prepared in this country has lost its power of dyeing blue, and is only of use in setting up fermentation in the indigo vat. It is, however, very improbable that a plant like *Isatis tinctoria* should entirely lose so characteristic a property as that of indigo-formation. It was, however, possible that some variation in the details of its manufacture might have had this effect. That fresh woad still can be made to yield indigo was shown, and the process of extracting it given in detail, in the paper above referred to.

Prepared woad is a dark brown, earthy-looking paste having an ammoniacal odour, yielding a yellowish-brown solution to water, and looking as unlikely a source of a blue dye as could

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